DOCUMENT RESUME

ED 424 826 HE 031 680

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|---|---|
| TITLE | Higher Education. Tuition Increases and Colleges' Efforts To Contain Costs. Report to the Honorable Charles E. Schumer, House of Representatives. |
| INSTITUTION | General Accounting Office, Washington, DC. Health, Education, and Human Services Div. |
| REPORT NO | GAO/HEHS-98-227 |
| PUB DATE | 1998-09-00 |
| NOTE | 46p. |
| AVAILABLE FROM | U.S. General Accounting Office, P.O. Box 37050, Washington, DC 20013; World Wide Web: http://www.gao.gov (first copy free, additional copies $2). |
| PUB TYPE | Reports - Evaluative (142) |
| EDRS PRICE | MF01/PC02 Plus Postage. |
| DESCRIPTORS | Community Colleges; Cost Effectiveness; *Costs; *Educational Finance; Expenditures; *Higher Education; Income; Operating Expenses; Private Colleges; Public Colleges; Trend Analysis; *Tuition |
| IDENTIFIERS | *Cost Containment |

ABSTRACT

This report presents results of a study of college tuition increases and what schools are doing to keep down costs. The study data included the years 1989-90 through 1995-96 and included community colleges and four-year public and private colleges and universities. The study involved use of multiple regression techniques, interviews with school officials and experts on college finance and policy, and a review of published research. Findings indicated that tuition has risen faster (30 percent) at both four- and two-year public institutions than at four-year private schools (17 percent) in the past 5 years, although dollar increases were substantially higher at private institutions. At both four-year public and private schools, the size of tuition increases was statistically related to such financial variables as schools' revenue from grants, contracts, and gifts; changes in government appropriations for public schools; and changes in schools' costs. A variety of cost-cutting strategies were identified, such as eliminating degree programs or academic departments, increasing class size, streamlining administrative operations, and privatizing such operations as bookstores and food service. Five appendices provide additional detail on the study's methodology, findings, and examples of cost-cutting efforts. Also appended are comments from the Department of Education. (DB)

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United States General Accounting Office

GAO

Report to the Honorable
Charles E. Schumer
House of Representatives

September 1998

# HIGHER EDUCATION

# Tuition Increases and Colleges' Efforts to Contain Costs

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**United States**
**General Accounting Office**
**Washington, D.C. 20548**

**Health, Education, and**
**Human Services Division**

B-279220

September 30, 1998

The Honorable Charles E. Schumer
House of Representatives

Dear Mr. Schumer:

The rising cost of tuition at the nation's colleges and universities has been a topic of considerable attention. Over the past two decades, tuition increases have substantially outstripped rises in median family income and the cost of living. In our study on tuition increases (including related fees) at 4-year public colleges and universities from school year 1980-81 through 1994-95, we found that the two major factors associated with these increases were the rise in schools' expenditures and schools' need to increase tuition revenue to make up for smaller increases in state appropriations.[1] A subsequent study by the National Commission on the Cost of Higher Education covering fiscal years 1987 through 1996 had similar findings and made a number of recommendations on the actions that could be taken such as strengthening institutional cost control to keep college affordable for anyone wishing to obtain a postsecondary education.[2]

You asked us to provide information about various issues regarding college tuition increases and what schools have done to keep down their costs. More specifically, you asked that we address the following four questions:

- To what extent have tuition increases varied by type and size of school?
- To what extent is there a statistical relationship between increases in tuition and other factors such as cost increases at the schools?
- To what extent have tuition increases at 4-year schools affected tuition at community colleges?
- What are some examples of strategies that schools have employed to reduce their own costs?

[1]Higher Education: Tuition Increasing Faster Than Household Income and Public Colleges' Costs (GAO/HEHS-96-154, Aug. 15, 1996).

[2]National Commission on the Cost of Higher Education, Straight Talk About College Costs & Prices (Phoenix, Ariz.: Oryx Press, 1998).

Our information covers community colleges and 4-year public and private colleges and universities.[3] The data we used are from the Department of Education and cover the most recent 5-year period available.[4] The tuition and related fee figures (which we refer to simply as "tuition") we use reflect schools' full prices that have not been adjusted for discounts or other forms of student financial aid. We conducted a statistical analysis using multiple regression techniques to determine the factors associated with variations in tuition increases.[5] In addition to analyzing the data, we interviewed various school officials and experts knowledgeable about college finance and policy issues, and we reviewed published research. Appendix I describes our scope and methodology in further detail.

## Results in Brief

On a percentage basis, tuition has risen faster at both 4- and 2-year public colleges and universities than at 4-year private schools—30 percent versus 17 percent in the past 5 years.[6] However, 4-year private schools, which had much higher tuitions to begin with, had dollar increases that were greater—$1,763 at 4-year private schools versus $670 at 4-year public schools and $288 at community colleges. The relative size of a school, whether public or private, appeared to have no relationship to the rate of increase. Large schools tend to have higher tuitions than small schools, and therefore, although the increase was greater in dollar terms at large schools, the percentage increases were about the same.

At both 4-year public and private schools, our analysis showed that the size of tuition increases was statistically related to a variety of other financial variables such as schools' revenues from grants, contracts, and gifts; for public schools, changes in government appropriations for higher education; and changes in schools' costs of providing education including noninstructional costs. For example, 4-year public schools that experienced larger reductions in government appropriations tended to have larger tuition increases. Likewise, schools that experienced greater

[3]We excluded 2-year private schools from this analysis because they constitute a very small segment of the total postsecondary education community.

[4]For our analysis of variation by type and size of school, this period was school years 1990-91 to 1995-96; for our analysis of the relationship between tuition and other factors, which required somewhat more detailed information than was available for 1995-96, the period began 1 year earlier, in 1989-90, and ended with 1994-95.

[5]These methods did not identify the causes of tuition increases; they identify characteristics of schools with larger or smaller tuition increases.

[6]These percentages are based on adjusting all dollar amounts to 1995 dollars to account for inflation. All dollar amounts shown in this report are adjusted to the last year of the 5-year period analyzed.

losses in grant revenues or greater increases in operating costs also tended to contribute to increase tuitions more than those schools that did not have these experiences.

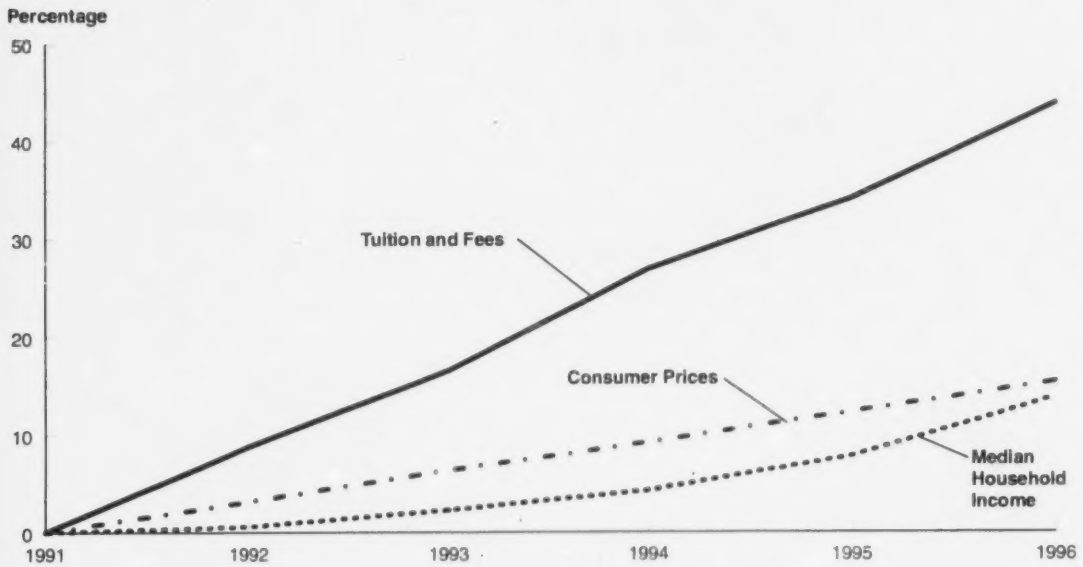
Tuition increases at community colleges have closely paralleled increases at 4-year public schools in recent years. However, there is little evidence that tuition increases at community colleges have been caused by increases at 4-year schools, according to officials and researchers we contacted and the literature we reviewed. Instead, the increases at both 4-year public schools and community colleges are similar either because they are set legislatively or administratively on a statewide basis or because the tuition-setting entities consider the same kinds of factors such as the Consumer Price Index (CPI) or state funding levels when deciding on tuition increases for both kinds of schools.

States, consortiums of schools, and individual colleges and universities have all taken steps to cut schools' operating costs in recent years. In our review of published reports and discussions with education officials, a variety of cost-cutting strategies surfaced, such as eliminating degree programs or academic departments, increasing class sizes, streamlining administrative operations, and privatizing operations like bookstores and food service operations. While these actions serve to reduce schools' own costs, they may not necessarily result in lower tuition for students because schools' costs may be only one of several factors considered when tuition-setting decisions are made.

## Background

During the 5-year period from school years 1990-91 through 1995-96, the average tuition for a full-time resident undergraduate student rose 43.8 percent, compared with an increase of 15.4 percent in CPI and 13.8 percent in median household income in current dollars (dollars that are not adjusted for inflation). (See fig. 1.) This difference continued a pattern that has been apparent for a much longer period. From school year 1980-81 through 1994-95, for example, the average tuition for a resident undergraduate to attend school increased by about 234 percent. During approximately the same period, the cost of living rose 74 percent and median household income rose 82 percent.

**Figure 1: Cumulative Percentage Increases in Tuition, Median Household Income, and Consumer Prices, School Years 1990-91 Through 1995-96**




Note: This comparison was made using data that are in dollars not adjusted for inflation.

Sources: Tuition and fee data are from the Department of Education; median household income data are from the U.S. Census Bureau; and consumer price data are from the Bureau of Labor Statistics.

The topic of college affordability has become an issue of growing concern not only for students and their parents but also for both the state and federal governments. Congressional committees have held a number of hearings on this issue and, in 1997, the Congress established the National Commission on the Cost of Higher Education to conduct a comprehensive review of college costs and prices. In its final report, issued in January 1998, the Commission stated that its members were convinced that if colleges and universities did not take steps to reduce their costs, federal and state policy makers would intervene and take up the task for them.

## Tuition Increases Varied by Type and Size of School

During the most recent 5-year period (school years 1990-91 through 1995-96), the rise in tuition was highest in percentage terms at public schools and highest in dollar terms at private schools. Tuition at public 2-year and 4-year schools rose 30 and 31 percent, respectively, compared with 17 percent at private 4-year schools. Private 4-year school tuition, which is generally much higher, had greater dollar increases—$1,763 compared with $670 and $288 for public 4-year and 2-year schools, respectively (see table 1).

**Table 1: Comparison of Average Undergraduate In-State Tuition and Fee Increases by Type of School, School Years 1990-91 and 1995-96**

| | Average tuition[a] | | Average tuition increase | |
|---|---|---|---|---|
| Type of school | 1990-91 | 1995-96 | Amount[a] | Percent |
| 4-year private | $10,480 | $12,243 | $1,763 | 17% |
| 4-year public | 2,178 | 2,848 | 670 | 31 |
| 2-year public | 951 | 1,239 | 288 | 30 |

[a]Dollar amounts are in constant 1995-96 dollars.

A school's size did not appear to have a substantial effect on the percentage increase in tuition. To determine the degree to which tuition increases were related to a school's size, we divided each type of school into quartiles according to fall 1995-96 enrollment levels. We did this for each type of school—public 2-year and 4-year and private 4-year. For each type of school, comparisons across the four quartiles showed that the percentage increases in tuition were about the same.

Although tuition rose at about the same percentage increase across the different sizes of schools, size did have some bearing on the dollar amount of the increases. For all kinds of schools, tuition tends to be somewhat higher at schools with higher enrollments. Even though the percentage increase was generally about the same, larger schools saw higher dollar increases (see table 2).

**Table 2: Tuition Increases, by Type and Size of School, School Years 1990-91 and 1995-96**

| Enrollment quartile (1 being the largest) | Amount of tuition increase | | |
|---|---|---|---|
| | 4-year public | 4-year private | 2-year public |
| 1 | $718 | $1,991 | $359 |
| 2 | 675 | 1,691 | 345 |
| 3 | 651 | 1,594 | 314 |
| 4 | 522 | 1,293 | 252 |

For example, private 4-year schools in the quartile with the largest enrollments (quartile 1) had an average 1990-91 tuition of $11,327, compared with $6,925 for schools in the quartile with the smallest enrollments. Although tuition rose by about the same percentage in both quartiles, tuition increased by $1,991 for the largest schools compared with $1,293 for the smallest schools. Appendix II provides more detailed information.

## Tuition Increases and Certain Financial Factors Are Related

The size of a school's tuition increase is associated with certain aspects of the school's financial situation, our analysis found. To determine what factors might help account for variations in tuition increases, we conducted a statistical analysis using multiple regression techniques. Multiple regression is a method for determining the existence and strength of associations between one variable—in this case, the amount of the tuition increase—and various other factors. These methods did not identify the causes of tuition increases; they identify variables related to larger or smaller tuition increases. It is particularly difficult to identify factors causing variation in tuition increases because schools' decisions to increase tuition and to increase expenditures are likely to be interdependent. For example, one study pointed out that schools with larger tuition increases may increase spending more because they have more income and because they may need to increase instructional expenditures more to maintain adequate enrollment.[7] In addition, the study reported that it is likely that schools' decisions to increase tuition and increase institutional financial aid may be interdependent, and it also suggested that larger increases in tuition could lead to larger increases in institutional financial aid, both because a school had more income and because it desired to maintain a diverse student body.

We examined a judgmentally selected set of 15 factors derived from information the Department of Education obtains annually in surveys of all postsecondary institutions eligible for federal education programs. This information includes a variety of financial trends (such as increases in instructional costs or school endowments) as well as other institutional characteristics (such as the ratio of in-state tuition to average tuition receipts per student). We focused this analysis on tuition (and required fees) for in-state full-year, full-time undergraduate students at 4-year public and private schools over the period covering school years 1989-90 and 1994-95 (the latest years for which information was available). We

[7]M.S. McPherson and M.O. Schapiro, Keeping College Affordable: Government and Educational Opportunity (Washington, D.C.: Brookings Institution, 1991).

adjusted tuition and all financial variables for inflation using the Bureau of Labor Statistics' CPI. For the list of all 15 variables and details concerning our analyses and results, see appendix III.

In general, the size of tuition increases at both 4-year public and private schools was most strongly related to the amount of change in school revenue from sources other than tuition and schools' costs of providing education, including noninstructional costs. Changes in the market value of schools' endowments were not related to tuition changes. Because the results differed to some degree between public and private institutions, we discuss each individually.

## Increases at 4-Year Public Colleges and Universities

For 4-year public schools, the 15 factors collectively accounted for about 85 percent of the variation in tuition increases. Seven important factors, which together accounted for about half of the variation, were as follows:[8]

- Change in government appropriations. On average, 4-year public schools saw declines in governmental appropriations (federal, state, and local) during the period—about $6,200 per full-time-equivalent (FTE) student in 1994-95, compared with about $7,100 in 1989-90.[9] Schools that saw the greatest declines in appropriations per FTE student typically had larger increases in tuition. These appropriations included unrestricted funding as well as appropriations for restricted purposes, such as particular building projects. These did not include, however, federal appropriations to fund grants to individual students.
- Change in instruction expenditures. Schools that had the largest increases in instructional costs per FTE student tended to have larger tuition increases after adjusting for the other factors we examined. Schools varied considerably in the extent to which their instruction costs changed. Some schools had increases while others had decreases. As a result, instruction costs per student changed little over the period. They were about $5,300 in both 1989-90 and 1994-95.

[8]See appendix III for a more detailed discussion of results for all factors analyzed. We identified variables as "important" here if the decline in the portion of variation accounted for (R squared) by omitting the variable from the model was greater than the decline observed from omitting other variables, one at a time. However, when the independent variables are highly correlated, it is difficult to distinguish their independent contribution to the portion of variation accounted for (R squared). Some of the independent variables we examined were highly correlated. For example, the change in revenue from grants, contracts, and other sources had a correlation of 0.76 with the change in research expenditures in the sample of public 4-year schools.

[9]The amounts are per FTE student at schools included in our regression analysis, weighted by each school's estimated FTE student count.

- Change in revenue from grants, contracts, and other sources. These "other" revenues, which totaled about $3,700 per full-time-equivalent student in 1994-95, include such nontuition items as grants and contract revenue from government and private sources. Schools that had larger increases in these revenues typically had smaller increases in tuition after taking into account the other factors analyzed. The average amount of these revenues increased from about $3,400 to about $3,700 from 1989-90 to 1994-95.
- Change in the amount by which revenues exceeded or fell short of expenditures. This is the amount by which a school's revenue exceeded or fell short of expenditures for current operations, which excludes revenue and expenditures for such things as noninstitutional grants to students, independent operations, auxiliary enterprises, and hospitals.[10] On average, public schools saw little or no change in this factor. On average, they had revenues exceeding expenses (a surplus) of about $160 per student in both years. Schools that had larger decreases in the annual current fund surplus, or increases in their deficit, tended to have larger tuition increases after taking into account the other factors analyzed.
- Change in other student-related expenditures. These expenditures were for the portion of "overhead" expenditures proportionally allocated as student-related expenses (instruction and student services) versus research and public service. Such "overhead" expenses included expenditures for libraries, museums, galleries, academic computing support, academic administration, general administrative services, legal and fiscal operations, public relations, operation and maintenance of grounds and facilities, funds for debt retirement, and improvements or additions to facilities. On average, institutions spent about $3,000 per FTE student in this category in 1989-90 and about $2,800 in 1994-95. Schools that had the largest decreases in this category typically had smaller increases in tuition.
- Change in nonstudent-related expenditures. These other expenditures include schools' spending on public service and overhead expenditures proportionally allocated to research and public service rather than student services and instruction.[11] These expenditures averaged about $2,100 in 1989-90 and about $2,400 in 1994-95. Schools with larger increases in this

[10]The Department of Education's Integrated Postsecondary Education Data System (IPEDS) surveys, from which we obtained these data, allow schools to account separately for current funds activity (educational and general revenue expenditures and transfers) and for activity in other funds such as endowment funds, funds for retirement of plant debt, and funds for renewals and replacements of facilities.

[11]Schools' spending on public service is for noninstructional services beneficial to groups external to the institution such as seminars and projects provided to sectors of the local community and schools' cooperative extension services funded by the Department of Agriculture.

category were more apt to have larger tuition increases after controlling for other factors (that is, after taking into account the relationship between tuition increases and the other variables we studied).

- Change in research expenditures. One of the missions of many 4-year colleges and universities is research. Schools report to the Department of Education amounts of their expenditures on research commissioned by an external agency or budgeted within a school. Research expenditures increased from about $2,000 to about $2,100 per student from 1989-90 to 1994-95. After controlling other factors, including changes in all current revenue, schools with larger increases in research expenditures were more apt to have larger increases in tuition.

## Increases at 4-Year Private Colleges and Universities

Our analysis for 4-year private schools included the same 15 factors used in analyzing public schools.[12] Together, these factors accounted for about 70 percent of the variation in tuition changes at private 4-year schools. Most of the factors that helped account for the variation were the same as those for 4-year public schools. For private 4-year schools, the seven factors that accounted for most of the variation were

- Change in revenue from grants, contracts, and other sources. Schools that had large decreases in these revenues typically had larger increases in tuition. These revenues averaged about $7,000 per FTE student in 1994-95, up from about $6,300 in 1989-90.
- Change in the amount by which revenues exceeded or fell short of expenditures. Although private 4-year schools on average saw little, if any change in these amounts, schools that had a large increase tended to have larger tuition increases. Conversely, schools that had smaller increases tended to have smaller tuition increases. On average, schools with smaller increases had a $200 decrease per FTE student in 1989-90 and a $300 decrease per FTE student in 1994-95.
- Change in other student-related expenditures. These expenditures averaged $5,700 per student in 1994-95, up from about $5,600 in 1989-90. Schools that had the greatest increases (or the smallest decreases) in this category typically had larger increases in tuition.
- Change in instruction expenditures. Unlike public schools, where instruction costs changed little over the period, private 4-year schools showed an increase in instructional costs during the 5-year period after adjusting for inflation. On average, the private 4-year schools we studied spent $7,000 per student in 1994-95, up from $6,200 in 1989-90. We found that schools with larger increases in instructional costs (and those that

[12]See appendix III for a more detailed discussion of results for the 15 factors analyzed.

had smaller decreases) per FTE student tended to have larger tuition increases.

- Change in the ratio of undergraduate tuition to average tuition received per FTE student. Some schools increased in-state undergraduate tuition charges more than other tuition charges, such as tuition for graduate or professional schools. The schools that did so saw larger increases in undergraduate tuition. On average, in-state undergraduate tuition was close to the average amount of tuition that schools reported receiving per FTE student in both 1989-90 and 1994-95.
- Change in research expenditures. Schools with larger increases in research expenditures were more likely to have larger increases in tuition after controlling for other factors. This does not mean that tuition increases with additional research, because much research is paid for by other revenue.[13] We were not able to identify how much of each school's "other" revenue was for research. Without that information, we could not determine whether research activity (including associated costs and revenue) was related to changes in tuition. Our analysis indicated only that research costs were related to tuition increases after controlling for other factors, including revenue and other costs. The average amount of research expenditures per student increased from about $1,300 to about $1,500 from 1989-90 to 1994-95.
- Change in other nonstudent-related expenditures. On average, these other expenditures increased from about $2,900 to about $4,100 per student over the 5-year period. Schools that saw larger increases in these expenditures saw larger tuition increases.

## Effect of 4-Year School Tuition Increases on Community College Tuition Prices

Although community college tuition increases have generally paralleled those of 4-year public schools, in our review of the literature and discussions with officials in the higher education community we found little evidence of any direct causative relationship between the two, at least on any widespread basis. That is, there is little evidence that indicates that community colleges, in general, raised tuition just because 4-year schools did.

In some states, however, there is some commonality in the tuition-setting policies and practices of both 4-year and 2-year public schools, and this can occur in a variety of ways. The following examples illustrate:

[13]Without controlling for other factors, changes in research were not correlated with changes in tuition to a statistically significant extent.

- In Alaska, the Alaska Board of Regents sets tuition for the state's 4-year and 2-year public schools and it applies the same policy to both types of schools. The Board's policy is to adjust schools' tuition annually on the basis of the average of the prior 3 years' Higher Education Price Index (HEPI).[14] The Board can also suspend this policy and adjust tuition by other amounts.
- In Nevada, the Nevada Board of Regents sets the tuition rates for both 4-year and 2-year public schools on the basis of recommendations by a committee composed of elected student government representatives, college presidents, and university system administration staff. In its deliberations, the committee is to consider a common set of factors for both kinds of schools. These factors include charges at peer institutions, changes in HEPI, and the cost of education.
- In Washington State, the legislature sets tuition for both 4-year and 2-year public schools, and it increased tuition for both kinds of schools by 4 percent for each of the 2 years in the 1997-99 biennium budget.

Thus, the tuition increases for public 2-year schools in states such as these are linked in one way or another to the tuition increases of 4-year schools. However, even in these states it cannot be concluded that 2-year school tuition increases were caused by tuition increases at 4-year schools.

## Examples of School Efforts to Reduce Costs and Improve Efficiency and Effectiveness

Many schools are taking a wide variety of actions to reduce or contain their own costs or improve the efficiency and effectiveness of their operations. In our 1996 study on the cost of college, we reported on examples of approaches taken by states and schools to ease the college cost burden to students.[15] For example, we found some initiatives that focus directly on charges students incur, such as limiting the amount of tuition increases, and other initiatives such as prepaid tuition plans that provide alternative ways of helping students or their parents pay for college.

To identify additional examples of schools' cost containment initiatives, we conducted a search of publications in the field, and we contacted researchers and representatives of schools and major higher education associations such as the American Council on Education. In some cases,

[14]HEPI is an index specifically designed to measure changes in the prices of goods and services commonly purchased by higher education institutions. Items that HEPI measures include faculty and administrators' salaries, fringe benefits, communication and data processing services, supplies and materials, library acquisitions, and utilities.

[15]GAO/HEHS-96-154, Aug. 15, 1996.

the actions we identified were being driven by state-level initiatives. In other cases, schools had initiated efforts either on their own or in conjunction with other schools.

Schools have initiated cost-cutting initiatives for a variety of reasons, such as to compenstate for cuts in state funding, to reallocate resources from one department or area of activity to another, or simply just to improve the economy and efficiency of their operations. While these kinds of activities help schools reduce their own costs, they do not necessarily result in lower costs to students because, in some states, schools' costs are only one of several factors considered when tuition-setting decisions are made.

## Responses to State-Level Initiatives

In some states, such as Ohio, Oregon, Virginia, and Wisconsin, the governor, legislature, or board of regents initiated efforts to contain costs or improve efficiency and quality in state-funded colleges and universities. For example, in 1994, Virginia's Governor and General Assembly asked the state's public colleges and universities to submit restructuring plans to improve quality and reduce costs. In subsequent years, the schools responded by taking or planning a wide variety of actions such as reducing the number of credits needed to graduate from most bachelor's degree programs to 120 credits, closing or merging a number of degree programs, increasing faculty productivity by teaching more students with fewer instructors, and privatizing various services such as food service and bookstores. In 1996, these actions had a value of $63.3 million in cost savings, and once all plans are fully implemented, the schools estimate financial benefits to be about $110 million annually. An official of the Virginia Council of Higher Education said this amounts to about 5 to 6 percent of the state's total educational and general appropriations for its postsecondary education system, which is almost $2 billion.

## Actions Initiated by Schools

Some schools have hired consulting firms to help them identify cost savings opportunities or otherwise become efficient. For example, in our discussions with representatives of five of the largest accounting firms, we found that four of them have departments or persons who specialize in helping schools develop strategies to contain costs or improve efficiency. These firms help schools develop strategic plans and institutional goals and evaluate opportunities for enhancing efficiencies. They also assist schools in redesigning and reengineering their business processes and information systems. According to one firm, it has worked with over two

dozen colleges and universities, medical schools, and state education agencies.

Since 1994, the National Association of College and University Business Officers (NACUBO), together with Barnes and Noble Bookstores, Inc., have sponsored a program that recognizes schools that have improved quality and reduced costs. The Higher Education Award program is fashioned after the Malcolm Baldrige National Quality Management program for businesses. It grants awards of $2,500 to $10,000 to schools submitting the best proposals for improving quality or reducing costs. For example, Loyola College in Maryland was one of six winners of the 1997 Higher Education Award. Its physical plant department improved operational efficiency and reduced expenses by forming self-directed work teams to assist with management functions. The end result was a decrease in overtime and an increase in the housekeeping staff's duties by 50 percent and more than $625,000 in annual savings.

A recent study by RAND, a private nonprofit research institution, found that some schools have joined together to undertake cost-savings initiatives. For example, 17 independent nonprofit colleges and universities in Virginia—the Council of Independent Colleges in Virginia—joined together to purchase a contract with a long-distance network carrier. As a group, the schools expect to save $4.65 million over the 3-year period of the contract.[16]

## Department of Education Initiatives

According to a Department of Education official, the Department does not have any programs that deal specifically with cost containment or efficiency improvement activities at postsecondary institutions. However, it operates a grant program, the Fund for the Improvement of Postsecondary Education (FIPSE), that offers schools funding for projects that will help them improve and become more efficient.[17] The University of Delaware, for example, is using a FIPSE grant to establish a longitudinal database on instructional costs and productivity to compare these factors among many institutions. Such information will eventually help schools identify departments, programs, or other areas where cost-savings opportunities are available.

[16]Tessa Kaganoff, Collaboration, Technology, and Outsourcing Initiatives in Higher Education: A Literature Review (Chicago: The Foundation for Independent Higher Education, 1998).

[17]Created by the Higher Education Amendments of 1972, FIPSE provides grants intended to support innovative educational reform projects that can serve as national models for the improvement of postsecondary education. From fiscal year 1994 to 1998, $83.9 million in FIPSE grant funds were used for over 1,100 new and continuing projects.

For fiscal year 1998, the FIPSE grant competition specifically addresses cost control at postsecondary institutions. For the purposes of the competition, FIPSE defines cost control as reducing the total amount that is actually spent by a school to bring a given number of students up to the level of postsecondary knowledge and skill that was achieved by comparable groups in previous years or as lowering the annual rate of increase of such costs significantly below its previous level. The Department awarded FIPSE grants to nine institutions that proposed projects to demonstrate innovative ways to reduce costs. Brief descriptions of these projects are contained in appendix V.

For more specific examples of schools' cost containment and efficiency improvement efforts, see appendix IV.

## Agency Comments

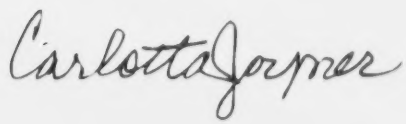
The Department of Education provided comments on a draft of this report. The comments are included as appendix V. The Department said that the report demonstrates that public school tuition and fees have increased primarily in response to reductions in state funding for higher education and that the report provides helpful examples of how states and schools are reducing costs. The Department also provided technical suggestions that we incorporated as appropriate.

Copies of this report are being sent to the Chairman and Ranking Minority Member of the Committee on Education and the Workforce of the House of Representatives; Chairman and Ranking Minority Member of the Committee on Labor and Human Resources of the U.S. Senate; the Secretary of Education; other appropriate congressional committees and Members; and others who are interested.

If you have any questions about this report, please call me or Joseph J. Eglin, Jr., Assistant Director, at (202) 512-7014. Major contributors to this

report include Charles M. Novak, Benjamin P. Pfeiffer, Charles H. Shervey, and Dianne L. Whitman-Miner.

Sincerely yours,



Carlotta C. Joyner
Director, Education and
Employment Issues

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**Abbreviations**

| | |
|---|---|
| CPI | Consumer Price Index |
| FIPSE | Fund for the Improvement of Postsecondary Education |
| FTE | full-time-equivalent |
| HEPI | Higher Education Price Index |
| IPEDS | Integrated Postsecondary Education Data System |
| MHEC | Midwestern Higher Education Commission |
| NACUBO | National Association of College and University Business Officers |
| TWU | Texas Woman's University |

Appendix I

# Scope and Methodology

For this study, we used annual tuition and school financial and enrollment data collected by the Department of Education from 4-year private and public colleges and universities and community colleges. We did not include 2-year private schools in this study because they constitute a very small segment of the total number of schools providing postsecondary education. We also excluded proprietary (for-profit trade) schools because, unlike the schools included in our study, they operate on a for-profit basis. For our various analyses, we used annual tuition and related fees for full-time in-state undergraduate students. We did not include data on other costs that students may incur while attending college such as for room and board, books and supplies, and commuting.

To determine the extent to which tuition increases from school years 1990-91 through 1995-96 varied by type of school, we used average undergraduate in-state tuition and fee data published by the Department of Education in the 1997 Digest of Education Statistics. To determine the extent to which the tuition increases varied by school size, we obtained and analyzed annual school-by-school tuition and enrollment data collected by the Department of Education through its Integrated Postsecondary Education Data System (IPEDS) for school years 1990-91 through 1995-96.

To determine the extent to which there is a statistical relationship between increases in tuition and other factors, such as school revenues and expenditures, we conducted linear regression analyses using IPEDS data for school years 1989-90 and 1994-95. We developed two regression models: one for public 4-year schools and one for private 4-year schools. We limited the scope of these analyses to 4-year public and private schools in the 50 states and the District of Columbia where more than half of the students enrolled in the fall term were undergraduates and where more than half of all students enrolled in the fall term were full-time students. To be included, schools had to report tuition revenue, instruction expenses, fall enrollment, and the typical tuition and required fee charge for in-state full-time full-year undergraduates. We excluded schools for which their tuition charge was less than 50 percent or more than 150 percent of reported tuition revenue per estimated full-time-equivalent (FTE) student. Our analysis included a total of 383 public 4-year schools and 761 private 4-year schools.

Our dependent variable in each model was the dollar change in in-state, full-time, full-year undergraduate tuition and required fees that each school reported to the Department in its IPEDS survey. We converted

1989-90 tuition figures to constant 1994-95 dollars using the Department of Labor's Consumer Price Index (CPI) for all urban consumers for that school year. This index indicated an 18.4-percent increase in prices over the period compared with a 19.5-percent increase in the Higher Education Price Index (HEPI), which tracks changes in the costs of items purchased by postsecondary schools.

Most of our independent variables were the dollar amounts of change in selected revenue and expense items per FTE student. Here again, we adjusted 1989-90 dollar figures for inflation using the CPI. We estimated the number of FTE students at each school by multiplying the number of part-time fall-term students by one-third and adding the number of full-time fall-term students. We recognize that the calculation of FTE students is a contentious subject and may differ considerably by type of school. However, we believe the calculation method we selected is appropriate for the purposes of our analyses.

Our independent variables included two categories of revenue from Part A of the IPEDS finance survey: governmental appropriations and revenue from grants, contracts, and other sources. We excluded the amount of (1) student scholarships, fellowships, and grants other than those from institutional funding sources and (2) revenue from hospital, independent, and auxiliary operations.

We placed expenditure items reported in Part B of the IPEDS finance survey into the following categories:

- instruction expenditures;
- student services expenditures;
- other student-related expenditures (a pro rata share of other expenditures excluding research, public service, hospital, independent and auxiliary operations and amounts of student scholarships, fellowships, and grants other than those from institutional funding sources);
- research expenditures;
- scholarships, fellowships, and grants to students from institutional funding sources (versus federal, state, local, or private sources); and
- other nonstudent-related expenditures including public service, pro-rata portion of academic support, institutional support, operation and maintenance of the physical plant, and transfers to other funds for purposes such as debt service and additions to the physical facilities. (We excluded hospital, independent and auxiliary operations and amounts of student scholarships, fellowships, and grants.)

Our analysis also included independent variables for the inflation-adjusted dollar change per student in (1) the market value of each school's endowment and (2) the amounts of tuition used for purposes not reported in Part A of the IPEDS survey. Our analysis excluded measures of quality of education and other services offered by schools.

As agreed with your office, the scope of this regression analysis does not identify the causes of changes in tuition. It is particularly difficult to identify factors causing variation in tuition increases because decisions to increase tuition and to increase expenditures are likely to be interdependent. In addition, it is likely that decisions to increase tuition and increase institutional (compared with federal) financial aid may be interdependent.

The Department uses separate IPEDS survey forms to collect fall enrollment data, finance data, and tuition data. In many cases, schools reported some but not all data for separate campuses or affiliates. As a result, in many cases schools used one identification number for finance data and used several identification numbers to report enrollment data. In some cases, schools reported data separately in one of the study years and in aggregate in other years. Where possible, we aggregated an institution's data, calculating estimated FTE weighted average tuition rates for the whole institution where tuition and enrollment data were available for subunits. Where this was not the case, we used tuition for the school entity for which financial data were reported. In many cases, data for some of the variables were missing for schools in either the 1989-90 or 1994-95 survey. We used imputed data from the Department where these were available. In many cases, data were missing and schools were excluded from our analysis.

To determine the extent that tuition increases at 4-year schools affect the costs of attending community colleges, we conducted a literature search and contacted representatives of major higher education associations, such as the American Association of Community Colleges, and individuals who have conducted research in the subject area.

To identify examples of schools' efforts to reduce their own costs, we conducted a literature search and contacted representatives of example schools and major higher education associations, such as the American Council on Education, and individuals who have conducted research in higher education finance issues. We also contacted officials from the

Department of Education and representatives of accounting and consulting firms that advise schools on cost containment strategies.

We conducted our work in accordance with generally accepted government auditing standards between October 1997 and July 1998. We did not verify the accuracy of data in the Department's IPEDS data sets. The Department uses several procedures for ensuring that the data are accurate, including a wide range of edit checks to ensure that numbers reported in different places in the survey forms are consistent and that numbers are within a range of tolerance compared with the schools' report for the prior years. Nonetheless, the Department does not conduct tests to ensure that schools' reported tuition receipts are consistent with the numbers of students enrolled and the tuition charges the schools report. In several cases, we found that schools' reported in-state tuition charges were less than 50 percent or more than 150 percent of receipts per estimated FTE student. Concerned that the data reported by these schools may not be consistent, we excluded them from our analysis.

Appendix II

# Variations in Tuition Increases by Kind and Size of School

**Table II.1: Variations in Tuition Increases at 4-Year Public Schools, School Years 1990-91 and 1995-96, by School Size**

| Enrollment quartile | Fall 1995 enrollment | Average tuition of schools in quartile | | Tuition increase | |
|---|---|---|---|---|---|
| | | 1990-91 | 1995-96 | Amount | Percent |
| 1 | 14,157 to 51,445 | $2,227 | $2,945 | $718 | 32% |
| 2 | 7,095 to 14,108 | 2,079 | 2,755 | 675 | 33 |
| 3 | 3,259 to 7,061 | 1,963 | 2,615 | 651 | 33 |
| 4 | 287 to 3,256 | 2,278 | 2,800 | 522 | 23 |

**Table II.2: Variations in Tuition Increases at 4-Year Private Schools, School Years 1990-91 and 1995-96, by School Size**

| Enrollment quartile | Fall 1995 enrollment | Average tuition of schools in quartile | | Tuition increase | |
|---|---|---|---|---|---|
| | | 1990-91 | 1995-96 | Amount | Percent |
| 1 | 2,500 to 35,835 | $11,327 | $13,318 | $1,991 | 18% |
| 2 | 1,352 to 2,492 | 9,707 | 11,398 | 1,691 | 17 |
| 3 | 666 to 1,343 | 8,893 | 10,487 | 1,594 | 18 |
| 4 | 3 to 664 | 6,925 | 8,218 | 1,293 | 19 |

**Table II.3: Variations in Tuition Increases at 2-Year Public Schools, School Years 1990-91 and 1995-96, by School Size**

| Enrollment quartile | Fall 1995 enrollment | Average tuition of schools in quartile | | Tuition increase | |
|---|---|---|---|---|---|
| | | 1990-91 | 1995-96 | Amount | Percent |
| 1 | 6,583 to 47,060 | $1,300 | $1,659 | $359 | 28% |
| 2 | 3,268 to 6,562 | 1,401 | 1,745 | 345 | 25 |
| 3 | 1,891 to 3,261 | 1,240 | 1,554 | 314 | 25 |
| 4 | 124 to 1,890 | 1,197 | 1,449 | 252 | 21 |

# Regression Analyses

To better distinguish the characteristics of schools that experienced larger increases in tuition from 1989-90 to 1994-95, we undertook a series of regression analyses. As shown in table III.1, we examined 15 variables in relation to changes in tuition.

**Table III.1: Variables Examined in Relation to Changes in Tuition**

| Variable | Description |
|---|---|
| Revenue | |
| Change in government appropriations | These included federal, state, and local appropriations to schools, excluding appropriations for grants to students such as Pell grants. This variable is expressed as the change in the 1994-95 constant dollar amount of these appropriations from 1989-90 to 1994-95 (the amount for 1994-95 less the amount for 1989-90). |
| Change in revenue from grants, contracts, and other sources | This is educational and general revenue excluding appropriations and tuition revenue. It includes grants, contracts, and gifts. It excludes funding received for noninstitutional student grants, scholarships, and fellowships and revenue for hospitals, auxiliary, and independent operations. This is the change in the 1994-95 constant dollar amount of these revenues from 1989-90 to 1994-95. |
| Expenditures | |
| Change in instruction expenditures | This includes expenditures for both credit and noncredit instructional activities expressed as the change in the 1994-95 constant dollar amount of these expenditures from 1989-90 to 1994-95. The Department's survey form for collecting this information instructs schools to include research expenditures not budgeted by the school. |
| Change in student services expenditures | This includes career guidance, counseling, financial aid administration, and student health services. This is expressed as change in the 1994-95 constant dollar amount of these expenditures from 1989-90 to 1994-95. |
| Change in institutional scholarships, fellowships, and grants | This is the change in the 1994-95 constant dollar amount of these expenditures from 1989-90 to 1994-95. |

(continued)

| Variable | Description |
|---|---|
| Change in other student-related expenditures | This includes a prorated portion of academic and institutional support, physical plant maintenance, and transfers to other funds. The variable is the change in the 1994-95 constant dollar amount of these expenditures from 1989-90 to 1994-95. |
| Change in research expenditures | The variable is the change in the 1994-95 constant dollar amount of these expenditures from 1989-90 to 1994-95. These figures include only research budgeted by the school. Other research expenditures are included with instruction expenditures. |
| Change in other nonstudent-related expenditures | This includes public service and a prorated portion of academic and institutional support, physical plant maintenance, and transfers to other funds. The variable is expressed as the change in the 1994-95 constant dollar amount of these expenditures from 1989-90 to 1994-95. |
| Other items | |
| Change in the ratio of in-state undergraduate tuition to average tuition received per FTE student[a] | This is expressed as the percentage point change in in-state undergraduate tuition as a percentage of average tuition revenue received per estimated FTE student. |
| Change in the amount of tuition used for noncurrent fund purposes | This is the change in the 1994-95 constant dollar amount of these expenditures or uses from 1989-90 to 1994-95. These are uses not noted among current funds expenditures. These may include uses in renewal, replacement, or addition to the school's physical plant or retirement of debt. |
| Ratio of in-state undergraduate tuition to average tuition received per FTE student[a] | This is expressed as in-state full-time, full-year undergraduate tuition as a percentage of the average amount of tuition and required fee revenue received per estimated FTE student in 1989-90. |
| Change in market value of the endowment fund | This is the change in the 1994-95 constant dollar amount of the fund balance from 1989-90 to 1994-95. |
| Level of in-state undergraduate tuition in 1989-90 | This is the in-state full-time, full-year undergraduate tuition rate in constant 1994-95 dollars. |

(continued)

| Variable | Description |
|---|---|
| Change in the amount by which revenues exceeded or fell short of expenditures (surplus or deficit in current account) | This variable is the change from 1989-90 to 1994-95 in the 1994-95 constant dollar amount by which general and educational revenue exceeded or fell short of general and educational expenditures. This excluded funds for noninstitutional scholarships, fellowships, and grants to students, independent operations, auxiliary enterprises, and hospitals. |
| Change in surplus (deficit) from independent operations, auxiliary enterprises, and hospitals | This variable is the change over the 1989-90 to 1994-95 period in the 1994-95 constant dollar amount by which revenue from independent operations, auxiliary enterprises, and hospitals exceeded or fell short of expenditures for the same. |

[a]Private school tuition is generally the same for in-state and out-of-state students. This variable may be affected by the mix of in-state and out-of-state students, the mix of undergraduate, graduate, and first professional students, and the mix of part-time and full-time students. While we recognize these mixes may differ considerably among schools, we did not attempt to analyze them.

As shown in table III.2, we computed several statistics for 4-year public and private schools indicating relationships between variables and changes in tuition. We indicate the portion of variation accounted for with and without adjustments for other variables.

**Table III.2: Statistics Concerning Selected Variables and Variation in Tuition Changes, From 1989-90 to 1994-95**

| Statistic (letter designates column in tables III.3 and III.4) | Description |
|---|---|
| A. Portion of variation accounted for after controlling for the other factors | The figures in this column indicate the extent to which the portion of variation accounted for (multiple R squared, the multiple coefficient of determination) declines with the deletion of each variable one at a time. In table III.3, for example, all the variables together accounted for 86 percent of the variation in tuition increases. When the analysis is repeated with all the variables listed except the first (changes in governmental appropriations), the portion accounted for declines by 64 percentage points to 25 percent. |

(continued)

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| Statistic (letter designates column in tables III.3 and III.4) | Description |
|---|---|
| B. Portion of variation accounted for without including factors listed lower | These figures indicate the cumulative portion of variation in tuition accounted for with the inclusion of each successive variable moving down the list. For example, the first two variables—change in governmental appropriations and change in instruction expenditures—accounted for 8.52 percent of variation in tuition increases. Adding a third variable to the analysis (change in nonappropriation revenue) increased the portion of variation explained to 10.97 percent. |
| C. Portion of variation accounted for by the addition of each variable to the model including factors listed in rows above | These figures show an increase in the portion of variation explained with the addition of each variable as you move down the table. Since adding the third variable, change in revenues from grants, contracts, and other sources, to the preceding two variables increased the portion of variation accounted for from 8.52 to 10.97 percent, the change associated with the addition of this variable was 2.4 percent. |
| D. Portion of variation accounted for by each variable separately (without controlling for other factors) | These figures show the portion of variation in tuition accounted for by each variable without controlling for any other variables. This is the correlation coefficient (column E) squared. |
| E. Correlation coefficient with change in tuition | These are the Pearson correlation coefficients of each variable with the dependent variable—change in tuition from 1989-90 to 1994-95. If increases in a variable were consistently associated with increases in tuition, the correlation would approach 1.0. If decreases in the variable were consistently associated with increases in tuition, the correlation would approach −1.0. If there were no statistical relationship between the two variables (without controlling for other factors), the correlation coefficient would approach 0. |

(continued)

| Statistic (letter designates column in tables III.3 and III.4) | Description |
|---|---|
| F. Regression coefficient | These are the regression coefficients, which indicate the model's estimate of how many dollars more tuition would increase with each dollar (or other unit of measure) change in each independent variable after controlling for all the other variables. For example, if instruction expenditures increased by one dollar more, the model predicts that tuition increases by about 76 cents more. Similarly, if governmental appropriations declined by one more dollar, tuition would increase by about 75 cents more (after adjusting for other variables). |
| G. Probability of the T statistic | These figures are the probability of the T statistic. They indicate, for each variable in the model, the probability that the statistical relationship between the variable and the variation in average tuition increases not accounted for by all the other variables was due to random factors. |

## Results for 4-Year Public Colleges and Universities

Together the 15 variables we examined accounted for about 85 percent of the variation in tuition increases among 4-year public colleges and universities. (Multiple R squared was 85.69 percent and adjusted multiple R squared was 85.11 percent.) The first seven variables shown in table III.3 were particularly important:[18]

1. change in government appropriations (federal, state, and local);

2. change in instruction expenditures;

3. change in revenue from grants, contracts, and other sources;

4. change in the amount by which revenues exceed or fell short of expenditures;

5. change in other student-related expenditures;

6. change in other nonstudent-related expenditures; and

[18]We identified variables as "important" here if the decline in the portion of variation accounted for (R squared) by omitting the variable from the model was greater than the decline observed from omitting other variables, one at a time. This technique is affected by strong correlations between the variables. An omitted variable may appear to be less important if it is strongly correlated with another independent variable.

7. change in research expenditures.

Schools that experienced larger increases in these expenditure items, larger decreases in these revenue items, or larger increases in surpluses or decreases in deficits were more likely than other schools to have larger increases in tuition. Deleting any one of these variables from the statistical analysis resulted in a decline in the portion of variation accounted for of more than 30 percentage points. (In other words, after adjusting for all the other factors in the model, each of these variables accounted for more than 30 percent of the variation in tuition increases.)

In contrast to other financial variables, such as the change in the value of the school's endowments, changes in amounts of institutional grants, scholarships, and fellowships, and amounts of tuition used for noncurrent fund purposes accounted for little, if any, of the variation in tuition increases.

**Table III.3: Factors Associated With Changes in Tuition at Public 4-Year Schools, From 1989-90 to 1995-96**

| | Portion of variation accounted for | | | | | | |
|---|---|---|---|---|---|---|---|
| | A[b] | B | C | D | E | Regression equation with all listed variables[a] | |
| | | | | | | F | G |
| Variable | after controlling for the other factors | without including factors listed lower[c] | by the addition of each variable to the model, including factors listed in rows above | by each variable separately (without controlling for other factors) | Correlation coefficient with change in tuition | Regression coefficient | Probability |
| Change in government appropriations [d,e] | 64.01% | 2.07% | 2.07% | 2.07% | -0.144 | -0.75 | < 0.0001 |
| Change in instruction expenditures[e] | 52.60 | 8.52 | 6.45 | 1.57 | 0.125 | 0.76 | < 0.0001 |
| Change in revenue from grants, contracts, and other sources[f] | 52.50 | 10.97 | 2.44 | 0.15 | -0.039 | -0.79 | < 0.0001 |
| Change in the amount by which revenues exceeded or fell short of expenditures | 46.52 | 12.53 | 1.56 | 0.11 | -0.034 | 0.77 | < 0.0001 |
| Change in other student-related expenditures | 41.17 | 18.90 | 7.93 | 0.49 | 0.070 | 0.76 | < 0.0001 |

(continued)

| | Portion of variation accounted for | | | | | Regression equation with all listed variables[a] | |
|---|---|---|---|---|---|---|---|
| | A[b] | B | C | D | E | F | G |
| Variable | after controlling for the other factors | without including factors listed lower[c] | by the addition of each variable to the model, including factors listed in rows above | by each variable separately (without controlling for other factors) | Correlation coefficient with change in tuition | Regression coefficient | Probability |
| Change in other nonstudent-related expenditures[f] | 31.79 | 32.67 | 13.77 | 0.43 | 0.065 | 0.76 | < 0.0001 |
| Change in research expenditures[f] | 30.53 | 46.70 | 14.03 | 0.24 | 0.049 | 0.80 | < 0.0001 |
| Change in the ratio of in-state undergraduate tuition to average tuition received per FTE student | 26.59 | 66.06 | 19.36 | 4.02 | 0.200 | 23.34 | < 0.0001 |
| Change in student services expenditures | 12.06 | 75.44 | 9.38 | 3.15 | 0.178 | 0.78 | < 0.0001 |
| Change in amount of tuition used for noncurrent fund purposes | 5.84 | 80.26 | 4.82 | 1.77 | -0.133 | 0.67 | < 0.0001 |
| Ratio of in-state undergraduate tuition to average tuition received per FTE student | 4.73 | 85.61 | 5.35 | 1.52 | -0.123 | 6.66 | < 0.0001 |
| Change in surplus or deficit from independent operations, auxiliary enterprises, and hospitals | 0.08 | 85.69 | 0.08 | 0.83 | 0.091 | -0.03 | 0.1484 |
| Level of in-state undergraduate tuition in 1989-90 | 0.00 | 85.69 | 0.00 | 2.28 | 0.151 | 0.00 | 0.7526 |
| Change in institutional scholarships, fellowships, and grants | 0.00 | 85.69 | 0.00 | 6.16 | 0.248 | 0.00 | 0.9267 |
| Change in market value of the endowment fund | 0.00 | 85.69 | 0.00 | 0.10 | 0.031 | 0.00 | 0.9984 |

(Table notes on next page)

Note: The dependent variable in each regression analysis was the change in full-time, in-state, undergraduate tuition from school year 1989-90 to 1994-95. This analysis does not identify the causes of changes in tuition. It is particularly difficult to identify factors causing variation in tuition increases because decisions to increase tuition, increase expenditures, and increase institutional financial aid are likely to be interdependent. Further analysis using techniques that could shed light on the nature of these interdependencies was beyond the scope of our work.

[a]The constant in the regression equation is -515.

[b]See table III.2 for an explanation of the statistics in each column.

[c]Analysis of changes in R squared by adding variables one at a time in reverse order (starting with change in institutional scholarships, fellowships, and grants and working up one variable at a time) further demonstrated the importance of changes in government appropriations. Only two other variables added more than 5 percentage points to R squared: adding institutional scholarships, fellowships, and grants to the analysis increased R squared by 6 percentage points, and adding change in government appropriations increased R squared by 64 percentage points.

[d]This and each of the other financial variables were expressed as a dollar change per estimated fall FTE student in constant 1994-95 dollars, except as noted.

[e]The utility of assessing the importance of a variable by deleting it from the model (as shown in column A) or adding it to a model (columns B and C) is limited where independent variables are correlated with one another. Change in government appropriations and change in instruction expenditures were correlated (r = 0.5658). Removing both these variables from the model decreased R squared by 66 percentage points to 20 percent.

[f]Change in revenue from grants, contracts, and other sources was correlated with change in research expenditures (r = 0.7594) and change in research expenditures was correlated with change in other nonstudent-related expenditures (r = 0.2962). The correlation between revenue from grants, contracts, and other sources and change in other nonstudent-related expenditures was similar (r = 0.3791). Removing these three variables from the model decreased R squared by 54 percentage points to 32 percent.

## Results for 4-Year Private Colleges and Universities

Our analysis accounted for less of the variation in tuition increases at private 4-year colleges and universities than it did at 4-year public institutions. The 15 variables we examined accounted for about 70 percent of the variation in tuition increases from 1989-90 to 1994-95. The R squared was 0.7199 and the adjusted R squared was 0.7142. Most of the seven most highly related variables accounting for variation among 4-year public institutions also figured prominently in our 4-year private college analysis. In addition, changes in the ratio of in-state undergraduate tuition to average tuition received per FTE student were helpful in accounting for variation in tuition changes. These highly associated variables were[19]

1. change in revenue from grants, contracts, and other sources;

[19]We identified variables as "important" here if the decline in the portion of variation accounted for (R squared) by omitting the variable from the model was greater than the decline observed from omitting other variables, one at a time. This technique is affected by strong correlations between the variables. An omitted variable may appear to be less important if it is strongly correlated with another independent variable.

2. change in the amount by which revenues exceeded or fell short of expenditures;

3. change in other student-related expenditures;

4. changes in the ratio of undergraduate tuition to average tuition received per FTE student;

5. change in instruction expenditures;

6. change in research expenditures; and

7. change in other nonstudent-related expenditures.

Other variables helped account for less than 10 percent of additional variation in changes in tuition after controlling for all the other variables.

**Table III.4: Factors Associated With Changes in Tuition at Private 4-Year Schools, From 1989-90 to 1995-96**

| | Portion of variation accounted for | | | | | | |
|---|---|---|---|---|---|---|---|
| | A[b] | B | C | D | E | Regression equation with all listed variables[a] | |
| | | | by the addition of each variable to the model, including factors listed in rows above | by each variable separately (without controlling for other factors) | | F | G |
| Variable | after controlling for the other factors | without including factors listed lower[c] | | | Correlation coefficient with change in tuition | Regression coefficient | Probability |
| Change in revenue from grants, contracts, and other sources [d,e] | 27.81% | 0.27% | 0.27% | 0.27% | 0.052 | –0.62 | < 0.0001 |
| Change in the amount by which revenues exceeded or fell short of expenditures | 27.02 | 1.07 | 0.80 | 0.61 | –0.078 | 0.61 | < 0.0001 |
| Change in other student-related expenditures | 26.12 | 1.84 | 0.77 | 1.84 | 0.136 | 0.61 | < 0.0001 |
| Change in instruction expenditures | 16.91 | 4.14 | 2.30 | 3.03 | 0.174 | 0.55 | < 0.0001 |
| Change in the ratio of undergraduate tuition to average tuition received per FTE student | 13.51 | 12.76 | 8.62 | 2.22 | –0.234 | 42.83 | < 0.0001 |
| Change in research expenditures[e] | 12.02 | 15.89 | 3.13 | 0.28 | 0.053 | 0.65 | < 0.0001 |
| Change in nonstudent-related expenditures [e] | 9.79 | 52.92 | 37.03 | 13.33 | 0.365 | 0.59 | < 0.0001 |
| Change in government appropriations | 7.22 | 57.55 | 4.63 | 0.00 | –0.005 | –0.78 | < 0.0001 |

(continued)

| | Portion of variation accounted for | | | | | Regression equation with all listed variables[a] | |
|---|---|---|---|---|---|---|---|
| Variable | A[b] after controlling for the other factors | B without including factors listed lower[c] | C by the addition of each variable to the model, including factors listed in rows above | D by each variable separately (without controlling for other factors) | E Correlation coefficient with change in tuition | F Regression coefficient | G Probability |
| Change in student services expenditures | 6.96 | 64.95 | 7.40 | 1.50 | 0.123 | 0.65 | < 0.0001 |
| Ratio of undergraduate tuition to average tuition received per FTE student | 2.28 | 67.81 | 2.86 | 2.22 | –0.149 | 15.28 | < 0.0001 |
| Level of undergraduate tuition in 1989-90[f] | 1.01 | 69.75 | 1.94 | 27.90 | 0.528 | 0.04 | < 0.0001 |
| Change in institutional scholarships, fellowships, and grants[f] | 0.63 | 70.39 | 0.64 | 25.48 | 0.505 | 0.17 | < 0.0001 |
| Change in amount of tuition used for noncurrent fund purposes | 0.33 | 70.72 | 0.33 | 0.10 | –0.031 | 0.15 | 0.0038 |
| Change in surplus or deficit from independent operations, auxilary enterprises, and hospitals | 0.04 | 70.76 | 0.04 | 0.24 | 0.049 | –0.02 | 0.2897 |
| Change in market value of the endowment fund | 0.00 | 70.77 | 0.004 | 0.29 | 0.054 | 0.00 | 0.7561 |

(Table notes on next page)

Note: The dependent variable was the change in full-time, full-year in-state, undergraduate tuition from school year 1989-90 to 1994-95. This analysis does not identify the causes of changes in tuition. It is particularly difficult to identify factors causing variation in tuition increases because decisions to increase tuition, increase expenditures, and increase institutional financial aid are likely to be interdependent. Further analysis using techniques that could shed light on the nature of these interdependencies was beyond the scope of our work.

[a]The constant in the regression equation is -1,230.

[b]See table III.2 for an explanation of the statistics in each column.

[c]Analysis of changes in R squared by adding variables one at a time in reverse order (starting with change in the market value of the endowment fund and working up one variable at a time) indicated greater importance for changes in institutional scholarships, fellowships, and grants. This variable added 25 percentage points to R squared in an analysis including the three variables listed below it in the table. Only two other variables increased R squared by more than 5 percentage points. These were the level of undergraduate tuition in 1989-90 and the change in revenue from grants, contracts, and other sources (adding 9 and 28 percentage points to R squared, respectively).

[d]This and each of the other variables were expressed as changes in constant 1994-95 dollars per estimated FTE student between school years 1989-90 and 1994-95, the amount for 1994-95 less the amount for 1989-90, except as noted.

[e]The utility of assessing the importance of a variable by deleting it from the model (as shown in column A) or adding it to a model (columns B and C) is limited where independent variables are correlated with one another. Change in revenue from grants, contracts, and other sources was correlated with change in research expenditures ($r = 0.5455$) and change in research expenditures was correlated with change in other nonstudent-related expenditures ($r = 0.3858$). The correlation between change in revenue from grants, contracts, and other sources and change in other nonstudent-related expenditures was in the same range ($r = 0.4146$). Removing these three variables from the model decreased R squared by 36 percentage points to 43 percent.

[f]Changes in other nonstudent-related expenditures were correlated with changes in amounts of institutional scholarships, fellowships, and grants ($r = 0.6242$). The level of undergraduate tuition in 1989-90 was also correlated with changes in other nonstudent-related expenditures ($r = 0.4126$). Change in institutional scholarships, fellowships, and grants and the level of undergraduate tuition in 1989-90 had correlation in the same range ($r = 0.5453$). Removing these three variables from the model decreased R squared by 49 percentage points to 23 percent.

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# Examples of School Cost Containment Efforts

## Statewide Initiatives

### Oregon Public Postsecondary Schools

In 1989, Oregon voters passed a ballot measure that reduced property taxes and shifted hundreds of millions of state tax dollars from state agencies, including higher education, to local school districts and prisons. To make up for the lost state tax revenues, the state's public postsecondary colleges and universities reduced the number of programs, closed a college, cut services, and laid off hundreds of nontenured faculty and staff. The schools were also required to develop scenarios for administrative cuts of up to 30 percent.

The University of Oregon, for example, implemented various measures to cut 15 percent, or $7.7 million, in the first round of cuts from its administrative budget. Subsequent savings efforts included the implementation of a new on-line financial information system. These actions have eliminated nearly all the paperwork and manual processing that was necessary before. Previously, it cost about $25 to manually issue a check, and now the cost is about $6. At slightly over 100,000 transactions per year, the estimated annual cost savings are between $150,000 and $190,000. In addition, the university expanded its procurement card program wherein departments are allowed to make purchases with a credit card instead of purchase orders. Through the combined expansion of procurement cards and reduced cost or elimination of checks for purchases made on the cards, annual savings are estimated to be about $18,000. This new system reportedly not only saves money and time but is also more convenient; products are delivered faster, and the schools' vendor base is larger because some businesses that do not accept purchase orders accept cards.

### Ohio Public Postsecondary Schools

In 1992, the Ohio Board of Regents initiated an effort to contain costs at public postsecondary schools. From fiscal year 1993 through 1997, the average annual savings was $55 million, totaling $270 million during the 5-year period. According to the Board of Regents' 1997 annual progress report on cost containment,

- nearly all campuses reported significant savings through the adoption of cost- and time-saving changes in the purchasing procedures, including the adoption of electronic ordering systems and participation in cooperative purchasing agreements with other institutions;

- several campuses are using technology to eliminate or reduce the paperwork for processing financial aid;
- nearly half of the campuses have reported reducing or containing the cost of providing health care benefits to their employees;
- many campuses have achieved significant savings through administrative restructuring and downsizing and by outsourcing many services previously done in-house; and
- many creative projects have been undertaken to significantly reduce the cost of providing energy for the lighting, heating, and cooling of campus facilities.

### University of Wisconsin System

The University of Wisconsin System and its 13 4-year schools and 13 2-year schools have taken a wide variety of efficiency-related measures. In addition to eliminating or consolidating a number of administrative functions and academic programs, the system and its schools have taken many other cost reduction or efficiency improvement actions. These include

- the implementation of injury prevention programs, safety awareness training, and better claims management, resulting in savings of $1.1 million;
- the establishment of preferred rate agreements with hotels and hotel chains, generating approximately $180,000 in annual savings; and
- the installation of more efficient and effective lighting at the Madison campus, bringing an annual savings of $475,000.

## Multiple School Collaborative Efforts

### Five Colleges, Inc.

Five Colleges, Inc., a consortium of five Massachusetts schools (Amherst College, Hampshire College, Mount Holyoke College, Smith College, and the University of Massachusetts at Amherst), was formed to share resources, services, and programs. The schools pooled faculty to create two consortium departments (astronomy and dance), to confer minor degrees and certificates, and to make joint faculty appointments. The consortium also offers open club membership, open theater productions, open library access, meal exchange, and cross-registration, all at no additional cost to students. The schools also have common contracts for

key services and a joint purchasing agreement that saves more than $1 million a year. They also share a risk-management expert, saving $300,000 a year, and a recycling coordinator, saving another $35,000 a year.

### Midwestern Higher Education Commission (MHEC)

MHEC, a regional consortium established in 1991, is made up of public and private nonprofit colleges and universities in Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin. The consortium has multiple programs under way to help MHEC member schools, such as

- Academic scheduling and management software, which was created in response to the needs of commission schools and offered to them at discounts saving the schools $800,000 in the lower purchase price.
- Virtual Private Network, which provides low-cost voice, video, and data transmission services at some of the lowest telecommunication rates in the country. This effort was especially helpful to smaller institutions that cannot leverage lower telecommunication rates on their own.
- Interactive Video Program, which provides over 100 members with discounted prices on interactive video equipment at a total savings of more than $7 million.

## Individual School Efforts

### Emporia State University

Emporia State University in Emporia, Kansas, has achieved cost savings and other efficiencies from actions taken, such as the following.

- Implemented an energy conservation program by installing building automation equipment. The retrofit networked about 70 percent of the campus with new controls and will produce an anticipated savings of about $571,500 per year.
- Purchased furniture that was constructed by Kansas Correctional Industries for the school's lounges, residence halls, most of the school's residence hall lounges, married student apartments, and several departments. Estimated saving was over $112,000 compared with furniture from the private sector. The school also purchased paint and custodial

supplies from the Correctional Industries for about half the price of buying them in the public sector.

- Negotiated a new lower-cost contract for deregulated natural gas, saving about $150,000 a year (depending upon winter weather conditions).
- Purchased 11,000 gallons of No. 2 fuel oil from federal surplus property for 10 cents a gallon versus the going price of 80 cents, saving about 88 percent, or $7,700. The school also purchased six new rooftop air-conditioning units from federal surplus property for $6,000 compared with the retail cost of $36,000.
- Negotiated with the telephone company for new phone service to the residence halls at a savings of $650,000, plus an additional annual $110,000 saved from 1985 to 1991 by eliminating the positions of switchboard operators used with the old telephone system.
- Saved $190,000 a year by training and qualifying employees as commercially licensed pest control applicators, thus eliminating the need to hire outside exterminators.

## San Diego State University

San Diego State University in San Diego, California, has achieved savings through various measures. For example,

- the school's Department of Electrical and Computer Engineering obtained donated software packages valued at over $12 million,
- the school negotiated its local telephone contract at an estimated annual savings of $33,000 compared with its previous services and
- the school hired an auditing firm to audit the phone bills received from vendors, resulting in $51,600 in savings from erroneous charges and $34,300 in refunds.

## Tennessee Technological University

Tennessee Technological University in Cookeville, Tennessee, issued a nonexclusive office supply contract with a local vendor, which saved about $320,000 in 6 months. The vendor will also make an annual contribution to the university's scholarship fund, based on a percentage of sales during the course of the contract. In addition, by procuring carpets through promotional sales or from a carpet mill's special goods section, the school saved as much as 75 percent of the retail cost.

## Texas Woman's University

Texas Woman's University (TWU), with campuses in Dallas, Denton, and Houston, Texas, implemented a reorganization in 1989, reducing the number of deans from 11 to 8 and the number of academic departments

from 28 to 21. These changes also achieved modest savings in administrative costs and promoted cooperation, coordination, and interdisciplinary collaboration. In the ensuing 5 years, TWU also phased out or eliminated approximately one-third of its degree programs.

## Thomas Edison State College

Thomas Edison State College in Trenton, New Jersey, reviews its collegewide operations periodically to determine opportunities for finding better and less costly ways to conduct its operations. Examples of cost-savings efforts it has undertaken include

- filling only staff positions determined to be the most critical in terms of efficiency or revenue enhancement, which saved the school nearly $725,000;
- using part-time temporary hourly staff (rather than full-time employees) to supplement full-time staff during periods of peak need and operation, saving the college about $240,000;
- restructuring and consolidating several departments, which enabled the school to achieve approximately $128,000 in personnel savings and additional savings of $108,000 by closing its Newark office facility; and
- restructuring its reprographic and data processing contracts, saving the school $135,000, and investing in automated postal zip coding equipment, saving it $18,000 in postal costs.

## Washington State University

According to documentation provided by a school budget office official, Washington State University in Pullman, Washington, through a wide variety of cost-savings measures, reduced its costs per student from $11,273 in school year 1986-87 to $10,998 in 1995-96 and its spending per degree granted from $48,294 in 1986-87 to $46,066 in 1995-96 (all figures adjusted for inflation). Some of the measures the school has taken to achieve these savings include

- reallocating funding from areas of declining enrollment to areas of expanding enrollment;
- increasing faculty productivity (over the past 4 years, FTE students have increased 12 percent while FTE faculty increased only 5.99 percent);
- operating a highly efficient composting program that diverts cafeteria food scraps, heating plant coal ash, and agricultural school animal waste and bedding materials to beneficial use at an annual savings of $200,000 in avoided disposal fees; and

- acquiring, at no cost, used motor vehicles, including tractors, backhoes, farm trucks, and pickups as well as electronic repair parts and computer components from the U.S. Department of Agriculture and the Boeing Company as federal excess property.

# Comments From the Department of Education

UNITED STATES DEPARTMENT OF EDUCATION

OFFICE OF POSTSECONDARY EDUCATION

AUG 21 1998

THE ASSISTANT SECRETARY

Ms. Carlotta C. Joyner
Director for Education and Employment Issues
Health, Education and Human Services Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Ms. Joyner:

Thank you for the opportunity to review the draft report *Tuition Increases and Colleges' Efforts to Contain Costs.*

The draft report demonstrates what we have believed for some time: public colleges and universities have increased tuition and fees primarily in response to reductions in State spending on higher education. This trend must be understood and addressed by policymakers at both the Federal and State levels.

Since 1980, we have seen State appropriations decline from 44 percent of total revenue for public colleges and universities to 33 percent. Over the same period, tuition and fees at these institutions increased from 13 percent of total revenues to 18 percent. Fortunately, recent reports suggest that States have begun to reverse this trend by increasing support to public colleges and universities. We must do everything we can to convince State policymakers of the importance of providing strong support for higher education.

At the Federal level, we should find ways to encourage institutions of higher education -- both public and private -- to reduce their costs without diminishing quality or access to higher education. Far too often, institutions have, when faced with reductions in resources, simply passed the costs on to students in the form of increases in tuition and fees. This report provides helpful examples of how States and institutions are reducing costs. The report also mentions the Department's recent FIPSE competition, which was designed to help institutions find innovative ways to reduce costs. I have attached a list of projects supported by this special competition.

Again, thank you for the opportunity to review the draft report.

Sincerely,

David A. Longanecker

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**FY 1998 CONTROLLING THE COST OF POSTSECONDARY EDUCATION**
**Abstracts of Projects Recommended for Funding**

Indiana University (IN) -- P116R 80004

IU will create a web-based, remedial, music fundamentals course that is both individualized and interactive. The course will permit concentration of faculty resources on non-remedial courses and employment of fewer graduate assistants in the remedial courses.

Nova Southeastern University (FL) -- P116 R 80017

The project will develop a three-year baccalaureate program for selected Nova students capable of advanced independent learning. The program will focus on learning outcomes rather than seat time, innovative pedagogies, and ongoing assessment. The primary vehicle for reducing students' time to degree will be through demonstration of proficiencies resulting in credit hour awards in the area of general education.

University of Massachusetts (MA) -- P116R 80038

The Amherst campus has been using an electronic homework system as a replacement for recitation sections in large-enrollment chemistry classes and has realized significant cost savings. The FIPSE project will expand the use of the system to courses in three other departments, and to two additional universities: Tuskegee and the University of Massachusetts at Dartmouth.

Dickinson College (PA) -- P116R 80056

Dickinson, Gettysburg, and Franklin & Marshall Colleges, independent colleges located in central Pennsylvania, will explore the feasibility of creating a joint entity to run the business functions of the three institutions. FIPSE support will enable the colleges to analyze business functions which might be centralized and implement cost-saving measures in a variety of functions ranging from purchasing to payroll to computer technology.

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University of Colorado at Denver (CO) -- P116R 80067

Support for a project designed to increase enrollments and quality in on-line courses through development of on-line student support services and teaching teams including primary faculty and graduate students. The project will also develop protocols that will allow all campuses in the Colorado University system to share on-line courses and revenues.

Colorado State University (CO) -- P116R 80085

Addresses the high costs of typical instructional chemistry laboratories through dissemination of CSU's Small-Scale Chemistry program to community colleges. The project will develop print, video, and Internet materials to support the community colleges, and will compare the direct and indirect costs of small-scale labs with traditional chemistry laboratories.

Roane State Community College (TN) -- P116R 80092

Roane State will develop a course management scheduling system with two primary purposes: to assist students in the timely completion of degree programs, and to help the institution manage scheduling problems involved in a multi-campus operation utilizing several modes of delivery. The scheduling system will enable the College to plan course offerings 2-4 years in advance.

Western Interstate Commission for Higher Education (CO) -- P116R 80094

WICHE's project will explore whether any cost reductions are resulting from the postsecondary community's large recent investments in education technology. Cost finding principles developed by the National Center for Higher Education Management Systems (NCHEMS) will be expanded to cover technology costing measures and a costing methodology for technology will be developed and tested in at least two states.

Santa Barbara City College (CA) -- P116R 80096

SBCC will develop an on-line course design and delivery system intended to lessen the time needed to develop courses for the Internet. The the new software will enable development of on-line courses by less technologically-oriented faculty, with less assistance from campus technology experts. Costs will be compared to the costs of developing such courses with current software.

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